

CLAIMS

- 1 1. A system for providing error correction in an imaging system, said system comprising:
 - 2 error determination means for determining an amount of error associated with a spot at
 - 3 (x,y) in a binary pattern to be imaged;
 - 4 determination means for determining the location of a nearest exposed spot at (x_i, y_i) for
 - 5 each spot (x,y) ; and
 - 6 dose modification means for modifying an exposure dose at the nearest exposed spot $(x_i,$
 - 7 $y_i)$ for each spot (x,y) .
- 1 2. The system as claimed in claim 1, wherein said error determination means includes
- 2 determining a convolution of the binary pattern to be imaged with a point-spread function.
- 1 3. The system as claimed in claim 1, wherein said error determination means includes
- 2 determining an inverse fast-Fourier transform of a product of a fast-Fourier transform of the
- 3 binary pattern and a fast-Fourier transform of a point spread function.
- 1 4. The system as claimed in claim 1, wherein said error determination means includes
- 2 determining a thresholding pattern as a function of the exposed pattern.
- 1 5. The system as claimed in claim 1, wherein the amount of error associated with the spot
- 2 (x,y) in the binary pattern to be imaged is provided as a difference between a thresholding pattern
- 3 and the binary pattern.
- 1 6. The system as claimed in claim 1, wherein said system includes repetition means for

2 iteratively determining the amount of error associated with a spot at (x,y) in the binary pattern to
3 be imaged until the amount of error is not greater than an acceptable amount of error.

1 7. A system for providing error correction in a lithographic imaging system, said system
2 comprising:

3 exposed pattern simulation means for simulating an exposed pattern of a binary pattern to
4 be imaged;

5 thresholding means for determining a thresholding pattern by applying a thresholding
6 function to the exposed pattern;

7 error determination means for determining an amount of error associated with a spot at
8 (x,y) in a binary pattern to be imaged corresponding to a difference between the thresholding
9 pattern and the binary pattern;

10 determination means for determining the location of a nearest exposed spot (x_i, y_i) for
11 each spot (x,y) ; and

12 dose modification means for modifying an exposure dose at the nearest exposed spot at
13 (x_i, y_i) for each spot at (x,y) .

1 8. The system as claimed in claim 7, wherein said exposed pattern simulation means
2 includes determining a convolution of the binary pattern to be imaged with a point spread
3 function.

1 9. The system as claimed in claim 7, wherein said exposed pattern simulation means
2 includes determining an inverse fast-Fourier transform of a product of a fast-Fourier transform of

3 the binary pattern and a fast-Fourier transform of a point spread function.

1 10. The system as claimed in claim 7, wherein said system includes repetition means for
2 iteratively determining the amount of error associated with a spot at (x,y) in the binary pattern to
3 be imaged until the amount of error is not greater than an acceptable amount of error.

1 11. A method of providing error correction in an imaging system, said method comprising the
2 steps of:

3 determining an amount of error associated with a spot at (x,y) in a binary pattern to be
4 imaged;

5 determining the location of a nearest exposed spot at (x_i, y_i) for each spot at (x,y) ; and

6 modifying an exposure dose at the nearest exposed spot at (x_i, y_i) for each spot at (x,y) .

1 12. The method as claimed in claim 11, wherein said step of determining an amount of error
2 associated with a spot at (x,y) in a binary pattern to be imaged includes determining a
3 convolution of the binary pattern to be imaged with a point spread function.

1 13. The method as claimed in claim 11, wherein said step of determining an amount of error
2 associated with a spot (x,y) in a binary pattern to be imaged includes determining an inverse
3 Fourier transform of a product of a Fourier transform of the binary pattern and a Fourier
4 transform of a point spread function.

1 14. The method as claimed in claim 11, wherein said step of determining an amount of error
2 associated with a spot at (x,y) in a binary pattern to be imaged includes determining a

3 thresholding pattern as a function of the exposed pattern.

1 15. The method as claimed in claim 11, wherein the amount of error associated with the spot
2 (x,y) in the binary pattern to be imaged is provided as a difference between a thresholding pattern
3 and the binary pattern.

1 16. The method as claimed in claim 11, wherein said method further includes the step of
2 iteratively returning to the step of determining the amount of error associated with a spot at (x,y)
3 in the binary pattern to be imaged until the amount of error is not greater than an acceptable
4 amount of error.

1 17. A method of providing error correction in a lithographic imaging system, said method
2 comprising the steps of:

3 simulating an exposed pattern of a binary pattern to be imaged;
4 determining a thresholding pattern by applying a thresholding function to the exposed
5 pattern;

6 determining an amount of error associated with a spot at (x,y) in a binary pattern to be
7 imaged corresponding to a difference between the thresholding pattern and the binary pattern;

8 determining the location of a nearest exposed spot at (x_i, y_i) for each spot at (x,y); and
9 modifying an exposure dose at the nearest exposed spot at (x_i, y_i) for each spot at (x,y).

1 18. The method as claimed in claim 17, wherein said step of simulating the exposed pattern
2 of the binary pattern to be imaged includes determining a convolution of the binary pattern to be
3 imaged with a point spread function.

1 19. The method as claimed in claim 17, wherein said step of simulating the exposed pattern
2 of the binary pattern to be imaged includes determining an inverse Fourier transform of a product
3 of a Fourier transform of the binary pattern and a Fourier transform of a point spread function.

1 20. The method as claimed in claim 17, wherein said method further includes the step of
2 iteratively returning to the steps of determining a thresholding pattern by applying a thresholding
3 function to the exposed pattern and determining the amount of error associated with a spot at
4 (x,y) in the binary pattern to be imaged until the amount of error is not greater than an acceptable
5 amount of error.